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ORIGINAL RESEARCH

Implementing a pandemic roster in a specialty emergency department: Challenges and benefits

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Abstract

Objective: To create a roster that eliminated unnecessary cross-staff exposure to ensure the hospital had sufficient staff to run the ED in the event that a group of staff are affected by COVID-19. This roster was aimed at providing staff with 'manageable shift lengths, down-time between shifts, regular breaks and access to refreshments' as dictated by the Victorian Department of Health and Human Services.

Methods: Creating six fixed teams in our ED. Teams work blocks of three consecutive days of 12 h shifts, each block alternates between day and night shifts.

Results: We managed to completely eliminate unnecessary crossover of staff thus reducing risk of having a large part of our workforce incapacitated should any member be affected by COVID.

Conclusion: A pandemic roster plan to minimise staff exposure from other colleagues during a pandemic was possible. This helps to ensure an adequate workforce in the unfortunate event a staff contracts the disease leading to other close contact staff requiring isolation or succumbing to the same illness.

Key words: *COVID-19, emergency medicine, hospital management, pandemic roster.*

Introduction

On 11 March 2020, the World Health Organization declared COVID-19 a pandemic. The rapid spread of coronavirus and lack of experience dealing with epidemics/pandemics left many countries and their health systems ill prepared. One often unplanned issue is that of hospital human resource management, in particular, rostering. An outbreak of infection among staff in an unprepared department can leave the workforce decimated. There is however a lack of existing rostering knowledge published in current literature let alone the topic of pandemic rostering.

The World Health Organization Hospital Preparedness for Epidemic guideline[1] provides sound advice on considerations while managing Human Resources within the hospital with protecting the health of hospital staff as priority. The issue of 'shortage of staff due to combination of staff absences and increased demand must be anticipated'. The guidance in Victoria, Australia, was for staff to be 'rostered appropriately, with manageable shift lengths, down-time between shifts, regular breaks and access to refreshments,[2] but without detailed specifications.

At the Royal Victorian Eye and Ear Hospital (RVEEH), we tried to mitigate the risk of exposure and crippling loss of manpower in the case of a staff member testing positive with COVID-19 by creating a 12 h team rotational system (the subject of the present paper) and instigating strict personal protective equipment (PPE) use within our ED. As we are a tertiary subspecialty hospital, we were not at the forefront of managing unwell COVID cases; this afforded us time to model and trial a pandemic roster despite being in a pandemic. Likewise we were fortunate that Australia was impacted by the virus later compared to other parts of the world. In our hospital, we were concerned that our two specialties of Ophthalmology and Otorhinolaryngology (ENT) were at particular high risk of exposure.[3–5] As guided by Department of Health and Human Services (DHHS) during the pandemic, our care was focussed on emergency care and non-emergencies (elective surgery and outpatients) were deferred where safe and possible. Therefore, within our hospital we identified the core services to be our ED and operating theatres and proceeded to create segregated teams.

Key findings

- Pandemic roster to eliminate unnecessary staff crossover is possible.
- Pandemic roster should be implemented early until mode of transmission, infectivity of disease and level of PPE required is established.
- Pandemic roster ensures adequate staffing, minimalises staff exposure, provides pyschological benefits and adequate downtime.

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Methods

Our original ED roster was composed of trainee ophthalmology registrars, ENT registrars and emergency medicine registrars. For ophthalmology trainees, rosters encompassed subspecialty outpatient clinics, operating theatres and ED. This, therefore, meant the ED roster would vary daily with differing people and number of staff working in close proximity. The unnecessary exposure of staff to one another is not ideal during a pandemic as all close contacts need to be quarantined if someone tested positive, potentially leading to a large part of the workforce being unable to work. We charted our chief registrar's exposure and discovered within a 14-day period he was exposed to 24 (69%) out of 35 ophthalmology registrars and fellows, four out of four unaccredited ENT registrars and seven out of seven emergency medicine registrars for greater than 2 h in a shared close space, fulfilling the DHHS definition[6] of a close contact. This did not include the exposure to senior medical staff, nurses and other allied health and administrative staff. We therefore concluded that if one of the doctors was diagnosed with COVID-19, it would severely incapacitate our workforce and undermine our ability to serve the public.

We devised a roster to divide our medical staff into teams based on one of our registrar's epidemic and pandemic management experiences from Singapore. This practice has been put in place for all businesses operating in Singapore since SARS in 2003 and updated more recently for the current outbreak.[7] The principle is to 'set up alternate teams of employees who can be deployed at different work schedules' and 'physically segregated to avoid the risk of infection between teams'.

From our pool of staff, we calculated that we could support six teams adequately. An additional 10 nurses, four clerks and two cleaners were acquired from our surgical theatres, inpatient wards and outpatient departments. All staff were required to exclusively work within their teams and in no other roles within the hospital or at other hospitals. Each team would consist of: two senior eye registrars, one to two junior eye registrars, one to two ENT registrars, one emergency medicine registrar, six nurses (as dictated by the Safe Patient Care Act[8]), one to two clerks and one cleaner. We then modelled two systems, one consisting of 12-h shifts for 4 days and another with 8-h shifts for 4 days; we labelled these four working days as the 'active' period. As we only had six teams, the 12-h shift model was more viable as it allows for longer rest period between active periods. It also allowed us to maintain a reasonable rest period in the event one or two teams became incapacitated.

Consultation with the Australian Nursing and Midwifery Federation (ANMF) was conducted, which resulted in a reduction of consecutive days of 12-h shift from four to three; this is elaborated below. The roster met the parameters set out by the Australian Medical Association and hospital's employment terms for clerks and cleaners. An example of our implemented roster is shown in Figure 1.

The roster places the next active teams (one for day shift and one for night shift) 'on-call'. It is important to mention that the entire active team is replaced by the on-call team; even if just one member falls ill. This is due to the assumption that other members of the team may be infected and infectious to others. Detailed instructions on changes to the roster should a team be incapacitated can be found in Figure S1.

Strict PPE practice was also instituted from early stages of the pandemic, our practice often exceeded the Victorian DHHS guidelines at the time. Further details pertaining to this are included in the discussion section below.

Results

We managed to create a roster that eliminated the unnecessary cross-overs between staff completely by creating teams who only interact with one another. The roster also

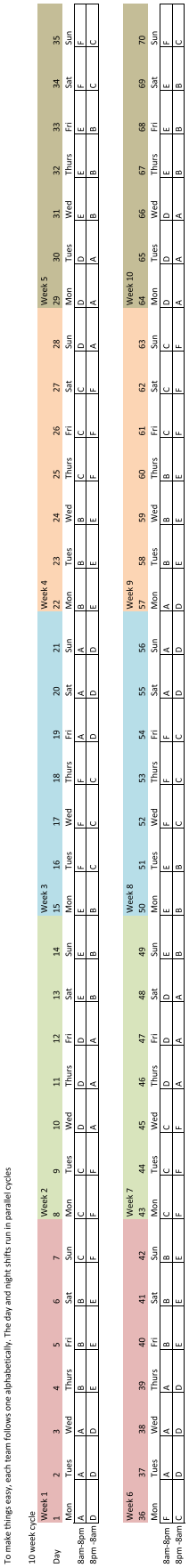

Figure 1. *Example of our implemented roster over a 10-week cycle.*

fulfils the guidance set out by the Victorian DHHS. The 3 days of 12-h shifts equated to 36 h per 'active' shift. Within a fortnight, teams would typically complete 1.5–2 active shifts which we felt was manageable. The roster also afforded for 6 days of 'inactive' rest time between active shifts.

The principles and practicalities of our COVID roster are summarised in Tables 1 and 2.

We only partially implemented our full plans with just the medical teams being involved. It was 1 day from being fully implemented (involving nursing, clerks and cleaners) when announcements were made in early May that elective surgeries would be eased. This impacted the planned nursing team structures as some were borrowed from theatres. The teams were dismantled in late June with the downtrending number of COVID-19 infections in Australia. With the resumption of elective surgeries, the pandemic roster was unsustainable from a medical staffing point of view. During the 3 months of the pandemic roster and to date (early December), no ED staff at RVEEH contracted COVID-19. The hospital has had four staff infections in total since 1 March 2020 (two community acquired and two from other health facilities) to current (12 January 2020). We attribute this to the strict PPE from the beginning of the pandemic. As a result of the low infection rates, the hospital did not reintroduce the pandemic roster during the 'second-wave' of COVID-19 in Victoria. It was felt that our level and strict practice of PPE usage rendered the staff low risk of acquiring infections at work and therefore a segregated team roster was not necessary.

TABLE 1. *Principles of creating a pandemic roster*

Principles
1. Creation of teams to eliminate the unnecessary crossovers between staff
2. Manageable shift lengths and down-time between shifts
3. Teams do not interact in person either at or outside of work
4. Members of teams do not work at other hospitals or clinics
5. Social distancing practised in and outside of workplace
6. Personal protective equipment as per Hospital ED guidelines to be strictly adhered to
7. If any one member of the team is unwell with COVID symptoms, the whole team is replaced by on-call team
8. The unwell member/s of the team must go for COVID testing and other members may be tested or quarantined as per DHHS guidelines

TABLE 2. *Practical considerations when creating a pandemic roster*

Practicalities
1. Team sizes and expertise level should be equivalent
2. Teams should have sufficient manpower and expertise to handle busier day shifts
3. The next active teams (one for day shift and one for night shift) is placed on call
4. Teams are overstaffed during the night shift. Teams are given the autonomy to manage this

Implementation and issues

Having created the roster, there was a 3-week delay between conception and implementation. Initially, the nationwide infection numbers were low and not increasing drastically; therefore, hospital management did not feel the need to implement the roster. As our plan involved much of the junior workforce to be assigned solely to the ED, there was some reluctance from other departments who would lose their manpower. However, as infection rates state-wide and nationwide increased, measures from the DHHS lead to majority of elective surgeries and outpatients being cancelled, the need for staff in these departments dissipated. Also as other hospitals started experiencing staff exposures; with some losing up to half of their manpower in their departments, it became apparent to our hospital management that a trial implementation of this roster would be beneficial to ensure we are able to continue to run our core service of the ED.

Initial implementation of the roster involved only doctors. The roster was met with positive support by our doctors as it provided a balanced work time and certainty on the individual's role during the current pandemic. Prior to implementation with elective surgeries and outpatient closing down, there was uncertainty on whether staff would be redeployed to other hospitals and roles.

Working with the same individuals daily also helped improve comradery among team members significantly. The teams appeared to work better having learnt one another's strengths, weaknesses and personalities. The close bonds developed were also a welcomed change from the COVID social distancing environment.

However, as we attempted to implement the roster for our nursing colleagues we encountered issues with the ANMF. As part of their policy,[9] any 'roster patterns that include 12-hour shifts must include representation from the relevant state or territory Branch of the ANMF'. The initially proposed 4 days roster was presented to the ANMF but was felt to be too taxing and hence the roster was reduced to 3 days of 12 h shifts.

In order to keep the outgoing and incoming teams physically distanced, we had to devise a new method using teleconferencing in two separated rooms. However, after 2 weeks, we noticed the overall quality of handovers reduced. Traditionally, all

patients attending overnight are discussed at morning handover; however, it was noticed that only the active patients within the department were being discussed. This was rectified with reintroduction of more stringent handover practices, no incidents of adverse outcome resulted from this short period of deterioration.

Discussion

We wished to share our experience of creating and implementing a pandemic roster for the ED at RVEEH in hopes it can serve as a scaffold for our colleagues elsewhere.

While devising the roster was relatively simple, the implementation of our plans was met with obstacles stemming from the fact that this is the first pandemic experienced within Australia in over a century. Key decision makers from hospital management, unions, medical colleges, state and national governments offered little guidance on how to manage human resources and unfortunately policies from 'normal' times initially served as a hindrance. Fortunately for us in Australia, the pandemic arrived later, which afforded us slightly more time to prepare compared to the rest of the world. We hope that these key decision makers will come together post-pandemic and discuss action to help ensure that a team-based pandemic roster where teams do not physically meet can be rapidly created and implemented.

A pandemic roster plan is necessary in all departments to minimalise staff exposure from other colleagues during the initial stages of an epidemic or pandemic when little is known about the mode of transmission, infectivity of the new disease and level of PPE required. The roster helps to ensure an adequate workforce in the unfortunate event a staff contracts the disease leading to other close contact staff requiring isolation. It provides cognitive benefits to the staff involved, providing one aspect of stability in an otherwise uncertain circumstance. It could serve as an initial scaffold to be built upon and adapted to hospital's own situation until there is confidence of control over healthcare associated infections. In order to maintain the teams, additional staffing may be required; in a general hospital setting, this may mean additional hiring or staff having to be redeployed from other specialities for the duration of the pandemic roster. Hospitals will likely need to prioritise which departments are most vital during the pandemic and bolster the workforce accordingly. There are administrative challenges, which need to be thought out and agreed upon thus allowing quick implementation should the need arise. These plans must be dynamic and adaptable to the circumstances, but every department should start with something.

Our level of PPE usage was and remains higher than the DHHS recommendation but likely accounts for the low rates of COVID-19 infections in our hospital. We instituted PPE and hand hygiene training for all staff in the department in mid-March 2020. Mandatory use of N95 mask, eye protection (in form of googles or face shield), gowns and gloves for all cases of conjunctivitis, nasal endoscope and suspected or confirmed COVID cases was introduced at the same time. The use of N95 and eye protection was extended to all close patient interactions from 1 April 2020 and remains to present (January 2020). The subject of level of PPE, mode of COVID-19 transmission and what constitutes an aerosol generating procedure remains contentious and not subject to discussion in the present paper. These practices reflect that of the ED and not necessarily the entire hospital.

Conclusion

A pandemic roster that completely removes unnecessary staff crossover is possible and beneficial albeit difficult. It helps to mitigate the risk of losing a large part of the workforce from the disease. While the roster may require reshuffling of staff from other areas of the hospital and may underutilise staff at times, the protection it provides to individuals involved and insurance against unplanned workforce loss cannot be understated. The practice of furloughing the entire team when one member falls ill helps decrease the risk of spread to staff and patients when it is difficult to determine who is infected and contagious. The pandemic roster is not designed to be permanent, but serves as an intermediary at the beginning of an epidemic/pandemic when little is known about the mode of transmission, infectivity of the disease and level of PPE required. It should be adapted or replaced guided by the hospital's control over healthcare-associated infections.

We have summarised the advantages and disadvantages from our pandemic roster in Table 3.

Acknowledgements

All RVEEH emergency staff involved in working the pandemic roster.

TABLE 3. *Advantages and disadvantages of a pandemic roster*

Advantages	Disadvantages
1. Ensuring sufficient staffing in the event an individual is exposed to COVID	1. Overstaffing and underutilisation of staff during night shifts
2. Minimalise unnecessary staff exposure to potential sources of infection	2. Slight understaffing during day
3. Psychological benefits of having stability of a defined work role during a pandemic	3. Quality of handovers deteriorated initially
4. Comradery between team members	
5. Sufficient down time between workdays for recovery	
6. Non-clinical time to run virtual clinical psychology workshops	

Author contributions

All authors contributed to the design and implementation of the research. BWYA wrote the manuscript and CC commented on the manuscript.

Competing interests

None declared.

Data availability statement

Data sharing not applicable - no new data generated, or the article describes entirely theoretical research

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Supporting information

Additional supporting information may be found in the online version of this article at the publisher's web site:

Figure S1. Example of how to shift teams should a team fall ill or be incapacitated for any reason.